

THE CONTRIBUTION OF STEPHEN JAMES JOHNSON TO THE STUDY OF AUSTRALIAN BUTTERFLIES

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Abstract

A summary is given of the life of Dr Steve Johnson (13 April 1950 - 16 December 2014) and his contribution to the knowledge of Australian butterflies. It includes analyses of his publications and his private collection, now lodged in the Museum of Tropical Queensland, Townsville, and photographs of some aspects of his work. He collected mainly in Cape York Peninsula and Torres Strait, made many new species records for Australia and discovered many new life histories.

Introduction

Stephen James Johnson (Fig. 1) was born on 13th April 1950 at Wynnum, third child to Stella and Arnold, younger brother to Bruce and Helene and soon to be older brother to Ian, Estelle and Elizabeth (Fig. 2). His childhood years were spent at Hemmant, then a semi-rural suburb of Brisbane. He attended Wynnum State Central High School until grade 4 and Church of England Grammar until matriculation in 1968. He was a keen sportsman and achieved full colours as a member of the undefeated first XV (Rugby Union) in 1967 and 1968 and a member of the first 8 (Rowing) in 1967 and 1968.

He failed to matriculate in 1967 (due to his sporting activities), repeated Senior and started at the University of Queensland in 1969, where he studied Veterinary Science, graduating in 1973.

Steve's professional life included private veterinary practice at Kingaroy before joining the Queensland Department of Primary Industries as a veterinary officer. He was stationed at Warwick Meatworks for five years before moving to Townsville in 1979 as a Veterinary Entomologist at the Oonoonba Veterinary Laboratory, which he subsequently headed until his early retirement in 2004.

His premature death in December 2014 brought to a close a productive contribution to the science and knowledge of Australian butterflies from a generous and erudite person.

Publications of S.J. Johnson and citation in this paper

All Steve Johnson's publications on Australian butterflies are listed and numbered in a Bibliographic Appendix to this paper. These papers are cited by boldface number in the following text. Other publications referred to in this paper are listed in the References and are cited in the text by author and date. Steve also made significant contributions to veterinary science, in particular on arboviruses. These publications, 30 in number, are also listed in the appendix but are not referred to in the text.



Fig. 1. Stephen James Johnson (13 April 1950 - 16 December 2014).



Fig. 2. The Johnson family in the early 1980s. Steve's parents Arnold and Stella seated centre. Their three sons (L to R) Steve, Bruce and Ian at rear, behind daughters Helene (L) and Elizabeth. Children at front are Steve's two children Sarah and Matthew with Helene's daughter Pip in centre. Arnold encouraged and supported Steve and Ian in their butterfly interests from a young age and sometimes accompanied them on remote field trips.

Early life in Brisbane

Like many active boys in the era before television, Steve wandered the fields, paddocks and swamps of greater Brisbane, collecting birds' eggs with brother Bruce, catching snakes, swimming in Bulimba Creek, diving off Hemmant Railway bridge and shooting sparrows for the Council bounty for pocket money. His constant companion was mischief. Steve was able to channel his boundless energy into rowing and football at school. As a robust second rower, rugby suited his less than genteel manner and, as his Dad described it, he went at it like a bull at a gate. Sport proved detrimental to his academic outcome in 1967 but, like most very bright people, he was able to turn this around in 1968 and matriculate. Steve's life changed in an even more positive way in 1967 when he met Bronwyn Clarke. They were inseparable and married in 1972. She became his loving wife, mother of his children (Sarah and Matthew) and unswerving supporter and confidant. For 38 years she was Neddy to his Jim (following Steve's love of the Goons).

While butterflies had featured briefly as a child, it was the necessity of his brother Ian to prepare a butterfly collection for a high school zoology class in 1969 that started a passion in Steve that lasted the rest of his life. He became an obsessive collector and observer of butterflies, very soon developing a focus on learning their habits and their life histories. While studying for his Veterinary degree, he would frequently visit the University of Queensland Insect Collection (housed at that time in the Agricultural Sciences Building, adjacent to the Veterinary Sciences Building). According to Geoff Monteith, the then Curator, Steve would arrive at lunch time (or during lecture breaks) to peruse the butterfly collection and discuss all things butterfly, occasionally accompanied by his father Arnold, known to most as Gator – one of the nicknames applied by Steve. It was a feature of his behaviour that almost everyone got a nickname, like it or not. Even then Geoff was very aware of Steve's unforgettable personality and exuberant approach to butterflies. Was he aware that his own nickname was Fangs?

Steve's time at Warwick saw a major expansion of his collecting interests and the development of woodworking skills that enabled him to make his own drawers and cabinets. For the rest of his life he prepared his own material, constructed his own drawers and cabinets and refined the design. He also designed and built collecting boxes and other equipment that accompanied him on field trips everywhere. Over time, his woodworking skills and tools expanded significantly and it was part of his love of butterflies that he was able to house his specimens in high quality storage facilities that he had built himself.

Moving to the tropics

Shifting to Townsville in 1979 was a significant milestone in Steve and Bronwyn's life and created many new opportunities for not only their respective professional careers, but also for Steve's growing passion for

tropical butterfly discovery. He had already completed a significant butterfly collecting trip to Iron Range and the McIlwraith Range of Cape York Peninsula in 1976 and another to Iron Range in 1978 (with his father, Murdoch De Baar and Darryl Washbourne), when they camped in Cook's Hut (Fig. 3), the famous butterfly hunters' dwelling and legendary abandoned home of former prospector and road maintenance man Reg Cook. Now Steve was in an even better location to expand his knowledge of Australian tropical butterflies. It was also how I came to know him.



Fig. 3. Cook's Hut at Iron Range, now demolished: (a) its exterior in 1980 (Photo by Alan Walford-Huggins); (b) from left, Arnold 'Gator' Johnson, Steve Johnson and Murdoch De Baar pinning specimens in Cook's Hut, 1978 (Photo by Darryl Washbourne).

Our paths had crossed even before we met. In 1976, Steve and his father had a grand adventure, their first trip to Cape York Peninsula and Iron Range. In that same year I also went to Cape York Peninsula and the McIlwraith Range. We both ended up at some point catching butterflies at Peach Creek, but that was something we only discovered later.

We first came together through the pages of *The Australian Entomologist* (then known as the *Australian Entomological Magazine*), where I read a 1979 paper by Sands, De Baar and Johnson (32) on the discovery of *Hypochrysops cleon* Grose-Smith, 1900 in Australia and he read a brief note by myself (Valentine 1979) on some northern Queensland butterflies. Over the next thirty years there were many original articles published by Steve and I, sharing the senior authorship: we jointly authored 30 peer-reviewed papers on Australian butterflies. On the strength of that first piece, Steve turned up at my office at James Cook University on the 21st February 1980. I was from a

farming background in Western Australia and had entered academia with appointment as lecturer in Geography at JCU in 1975. I had developed a passion for nature as a boy and first discovered butterflies when I started research on tropical rainforests in northern Queensland. I set out to use them as cues to the environment but soon came to enjoy them in their own right. Steve and I immediately established a rapport and a partnership that persisted until his death. My diary notes: '*Steve Johnson - ex Warwick, now with DPI, Oonoonba - came out to Uni. Very keen collector with 10 years experience. Plan some trips together.*' Steve Johnson became my close friend - my best mate - for 35 years, half my life. We undertook many trips together of thousands of kilometres by 4WD vehicle, by aircraft and by helicopter over many parts of Australia.

Steve was a genuine pioneer in the study of Australian tropical butterflies and was the most accomplished observer of butterflies in the field that I knew. Much of our knowledge of Australian tropical butterflies is due to Steve's observations right across the continent. He was not just an expert but was always generous with his knowledge; dozens of people benefitted from his personal assistance. In preparing this account I have received numerous comments from others about how kind and helpful Steve was to them. He shared his knowledge willingly and he gave strong personal support to everyone he met. Every request was responded to quickly and generously. Steve was a very positive person himself and he shared that with others, finding a way to acknowledge good work by them.

Steve was prolific in writing up his observations and was an excellent author. He later was a first-rate editor and referee for publications.

For Steve and I the relationship transcended butterflies. Our families were drawn in to numerous picnics and camping expeditions that, for some reason, always took us to excellent butterfly places. Our children played together under the watchful eyes of their mothers, Bronwyn and Valerie, while their fathers were off stalking butterflies. Some places were close to home around Townsville but others required the two families to take extensive trips - to Iron Range and to Rocky River and to other places on Cape York Peninsula. Steve's children Matt and Sarah and our daughters Polly, Leonie and Kate were good friends and all loved the farm environment of Oonoonba Veterinary Laboratory where the Johnson family lived.

While based in Townsville, Steve not only completed his BSc in Entomology at the University of Queensland (including a stint full time back in Brisbane), graduating in 1984, but he commenced and completed a PhD in Veterinary Entomology at James Cook University, graduating in 1989. His PhD thesis, *Studies of Stephanofiliariasis in Queensland*, was based on abattoir, field and laboratory studies and is a major contribution in the field. Since completion it has been downloaded from the James Cook University online library a total of 553 times (as at June 2015) and is still being accessed frequently. As an

indication of its global significance, downloads include those by researchers in the USA (100), Australia (73), Indonesia (56), India (50), Germany (45), China (21) and Bangladesh (21). In keeping with his collaborative approach, Steve Johnson's professional publications in the field of veterinary entomology include a total of 30 refereed papers with 42 different co-authors (excluding his butterfly papers; see Appendix). The main focus of Steve's professional work was in blue tongue viruses and the risks to the Australian sheep and beef industries. He was a very significant participant in the sentinel herds established as part of national biosecurity arrangements, involving regular monitoring of small herds across the tropics in order to detect the possible arrival of arboviruses. Several major projects he managed required extensive field work across the northern tropics, from Western Australia to Queensland.

The focus of Steve Johnson's butterfly work

While there had been significant work on butterflies in tropical Australia from the very early years of European settlement, there had been few resident collectors since Frederick Parkhurst Dodd resided in Kuranda (Monteith 1991). Steve brought a substantial scientific knowledge base that was very effective in revitalizing the biological studies of Australian tropical butterflies. In the early years his focus was exploratory: field studies in locations where little was known about the butterfly fauna. Cape York Peninsula continued to be a major drawcard, with almost every trip producing new material and new observations. But, in addition, Steve explored local environments in the Townsville and Cairns region and planned specific searches in regions wider afield in tropical Australia.

As his knowledge and familiarity with Queensland butterflies advanced, Steve began to look further afield, both within the tropics (in Western Australia and the Northern Territory) and also in the southern States. But his primary focus remained the tropical species and their habitats. A typical trip to Iron Range during the 1980s might involve three weeks camped in the rainforest, with tarps for weather protection and everything required for collection. Cook's Hut, often used by visiting biologists to Iron Range and now demolished, was used occasionally but generally not and all camping needs had to be brought in with the vehicle, including fuel. In those days it was a three-day effort to get there from Townsville, with very rough roads beginning at Mt Carbine, where the bitumen ended. Winching was often required to cross flooded creeks and boggy areas. Major effort was needed at the large Wenlock and Pascoe Rivers on the final stage of the trip and crossing the several fords on the Claudie River was rarely easy. Each trip required shovels, chainsaws and winches just to get there and in the earliest years fuel was barged in to Lockhart River.

Being the person he was, Steve was often drawn in to provide free veterinary services for the local community at Lockhart River during his field trips. That

also involved neutering the many unmanaged dogs in the township at the request of the council and local people.

Field methodology

Collecting specimens at Iron Range was usually focused along the bush tracks and mining roads, including the tops of Lamond and Phillip Hills. Particularly long net handles had been made by Steve to try and access the higher canopy areas - these poles were carried on the vehicle roof tops secured by stockings, collected for that purpose from female friends and relatives. With Steve's typical wit these poles had to have a name and became the gorgonzolas - with reference to how 'high' they could reach. Even with these long extensions many butterflies were out of reach, a continuing frustration for decades. Another focus was to use hilltops or adult leks to try and collect specimens. At Iron Range, Phillip and Lamond Hills, plus other high points and ridges, worked very well for many species. In the case of the many *Phyliris* Röber species (Lycaenidae), it was noted that adults aggregated on certain very tall trees and could be collected using the long pole extensions, sometimes aided by standing on top of the vehicle roof-rack. During the three week camp, butterfly collecting occurred along the roads, which were walked every day multiple times. At that time there were many flowers that attracted adults and enabled easy collecting.

One approach that Steve adopted was to search for juvenile stages. Any female was a good target to watch and wait. Typical female oviposition behaviour, fluttering around plants for example, would elicit a reprieve from the net and some careful observation. Rewards were not common but did allow a number of new life histories to be obtained. That nearly always required multiple steps of identifying the plant, acquiring a specimen for the purpose-built shade houses back in Townsville and then, on later trips, searching plants for juvenile stages of the butterfly to take back for captive rearing. Occasionally, if small plants were evident in the bush they might be dug up and taken back with larvae or eggs intact. Or, if the plant was already well known and occurred locally in the Townsville region, the juvenile forms might be taken back with enough bagged material to last the journey south. For example, larvae on mistletoe sometimes may be readily transferred from one species to another. Sometimes larval stages could be found by simply observing evidence of feeding marks on the plants or, in the case of Hesperidae, looking deliberately for larval shelters. On other occasions, adult females would be collected and bagged with any known or suspected larval food plant to try and induce oviposition.

Adult specimens, once collected, were always set in the field. Steve normally set each specimen on the day it was caught and avoided placing it in a paper triangle for later setting. To this end, he designed and built large setting boxes with several foam boards that would take many specimens set in the field (Fig. 4). These were generally given high priority in the packing of the

vehicle. In more recent years, when 12-volt refrigerators were used, specimens were sometimes kept fresh or even frozen for the journey home.



Fig. 4. Steve Johnson setting butterflies on Dauan Island in 2004. The polystyrene foam boards fitted into a specially made rugged box that was essential kit on every field trip. The silky oak pin boxes (foreground) were made to carry setting equipment securely.

During the field trips at Iron Range, a list of species collected and observed was made. It was not unusual to record over 120 species during a three-week field trip and there was an attempt to improve the list each visit. I think the maximum recorded was 128 species in three weeks. Another dimension to his Iron Range work was the adaptation of canopy traps, following a design from Mike Barnett who had used them in Uganda. These were suspended under the canopy, baited with rotting fruit and other delights, and proved very effective for *Charaxes latona* Butler, 1865 and a number of other nymphalids (Fig 5).

Iron Range has strong challenges for collecting and two species illustrate this well. The hesperiid butterfly *Rachelia extrusa* C. & R. Felder, 1867 was initially collected in Australia on the slopes of Mt Tozer by Geoff Monteith (Atkins 1975) and very few specimens were known until Steve collected males from a tree canopy near the second crossing of Gordon's Creek. For the next two decades all specimens collected were from this exact same site and all were males. It was clear that this was a lek for males. Females were discovered later at other rainforest-edge sites, including specimens reared by Steve from the McIlwraith Range (45). The lycaenid butterfly *Hypochrysops cleon* Grose-Smith, 1900 was first found by Steve at Iron Range on a treetop

from a ridge just south of the old track up Phillip Hill (32). Since that time all other specimens of this species have come from that same treetop, except for the only two females known, collected by David Lane and myself in 1984, near the first crossing of Gordon's Creek (unpubl. obs.). There are still no other females known but males continue to lek at the original tree. Specimens of many species from Iron Range (Fig. 6), in collections across Australia, have been made possible by Steve's discoveries.



Fig. 5. *Charaxes latona* (Nymphalidae: Charaxinae): (a) specimen perched in the canopy at Iron Range, photographed from Steve's cherry picker; (b) Steve with one of the fruit-baited traps hauled to the canopy to catch *Charaxes* and other nymphalids.

Using historical records and environmental data

Steve was a great advocate of learning from earlier workers and would frequently consult the literature or talk to other butterfly people to gain an insight on how to learn more. A good example was the work on the life history of the Moth Butterfly, *Liphyra brassolis* Westwood, 1864 (Lycaenidae). The published observations and F.P. Dodd's speculations (Dodd 1902) were studied carefully and collection data from others then was used to refine the search. It was apparent that G.A. Waterhouse had found the species on Great Palm Island (Waterhouse 1932) and consulting with an Ingham fruit grower (Herb Bosworth) led to the conclusion that a careful search of old citrus orchards on Palm Island might be worthwhile. Having arranged for permission, the expedition proceeded with great success and resulted in the discovery of many larvae and pupae. Because direct evidence of butterfly larval carnivory was being sought, Steve set up a glass aquarium so that the feeding behaviour could be observed and photographed. This enabled the first photo of actual carnivory to be taken and published (16).



Fig. 6. Steve Johnson and Peter Valentine at Iron Range, one of dozens of trips made over forty years (Photo by Andrew Rankin).

Another example of field planning was an attempt to predict maximum butterfly activity in the wet-dry tropics, especially in central Cape York Peninsula. There were good grounds to expect very high early wet season activity amongst butterflies that specialised in avoiding the dry conditions and Steve set up a target to visit Mt White, a well known hilltop location near Coen. The timing, it was reasoned, needed to be not long after the first major rainfall - presumed to break the diapause of adults or pupae. Such rain might also initiate fresh growth on potential larval food plants. Coordinating with a local cattle station owner, the situation was monitored and, in January 1988, the trip to Mt White was timed for 10 days after a major rain event. While conditions were appalling for field work (very hot and very steamy), the outcome was astonishing, with both a huge abundance of adult butterflies (17) and two new life histories recorded as a result - *Libythea geoffroy nicevillei* Olliff, 1891 (18) and *Graphium aristeus* (Stoll, [1780]) (36).

The Torres Strait islands

A significant frontier for Steve was to investigate the butterfly fauna of the Torres Strait islands. This era of his work began in 1983, when Steve made a brief trip to Thursday and Darnley Islands (4). Steve's quarantine work took him to Torres Strait occasionally and he developed connections that facilitated later butterfly trips. He was able to gain an occasional berth with customs and quarantine missions up the east coast and within the Torres Strait. While collecting samples for arbovirus work, he was also able to inspect the butterfly fauna. This part of his butterfly activity was further built up after his physician brother Ian undertook some medical work on Thursday Island in the 1980s and provided a knowledge base from which Steve could later explore the more remote islands, including Dauan in 1989. Visits to Murray and Darnley Islands (in 1993 and 1994 respectively) and Moa Island in 1993 (38) added to the Torres Strait exploration. Dauan became a favourite destination and was very prolific. Initially, the trips to Dauan involved a flight to Saibai and accommodation at the school and then persuading a local inhabitant to provide transport across to Dauan. After purchasing a drum of outboard petrol, a walk along the beach usually revealed an aluminium dingy, with the owner willing to provide the crossing. On one trip it was a pair of young boys who seemed to delight in ensuring the passengers (Steve and I) suffered the maximum impacts from wave thumps. Later, a ferry service was initiated and access became a little more reliable, but not much. On our 2004 trip the ferry had drifted and washed up on rocks the night before we were due to return to Saibai. After a fair delay the boat was retrieved and brought around for loading. The other passenger was the Dauan Council chair, Mrs Margaret Mau, which is probably why the vessel was made ready. By the time we reached Saibai we were up to our shins in sea water and sinking fast, just making the jetty in time with setting boxes held high.

An increase in species collected at Dauan occurred when Steve (and Ian) arranged helicopter support to get to the top of Mt Cornwallis, the island's central 275 m peak surrounded by vine thicket and suspected of being a good hilltop for collecting. It was here that Steve first collected the Map Butterfly, *Cyrestis achates nedymnus* C. & R. Felder, 1865, having seen it previously on one of the beaches in the same year it was originally collected (Lambkin and Knight 2005). In his last year of life, while badly impacted by the cancer, Steve went up to Dauan and camped overnight on the peak of Mt Cornwallis with his brother Ian. He always loved his time on this island.

Tropical Western Australia

Partly connected with his professional quarantine and biosecurity work on monitoring the tropical coastline for invading arboviruses, Steve was invited on a cruise through the offshore islands along the Kimberley coast in April 1991. Support included a helicopter to access some of the islands and Steve was able to sample many of the island butterfly populations (5).

This also stimulated further his interest in exploration of this part of Australia and, to this end, Steve arranged for a fixed-wing aircraft to fly in to the Mitchell Plateau in the 1995 wet season. As space was at a premium, priority was given to butterfly collecting material, the inevitable setting boxes included. A bush pilot, John Collins, took us in to a remote airstrip and hired us his old 4WD vehicle, which he kept near the airstrip, so we could get around. We were the only people on the plateau at this time (the road was still closed). Because the plane was very small we had very little luggage. After the critical butterfly equipment we had room for a sleeping bag each, a gas stove and bottle, a billy and two plates. Setting butterflies was always a high priority, so Steve built a collapsible table that could fit into the plane so we had a work surface. The only food we could fit in was dehydrated - add water and boil type: the water came from a nearby creek. We would consume these packet meals having to imagine the bit of the instruction that said 'add steak' or 'add chicken'. Steve referred to his designer table as the 'have table, will travel' and it later made many more trips with us. The trip was a great success and was followed by further time at Kalumburu before a cyclone drove us out (20).

Discovering cancer

Cancer became part of the Johnson family's life when his wife Bronwyn was diagnosed and treated for breast cancer in the mid 1990s. In 1998 Steve had an off-road caravan built and he began to use that with Bron to spend time in remote parts of Queensland, including Iron Range, looking for butterflies. In 2001 we took long service leave and, with our wives, spent three months in northwestern Western Australia, down the west coast and through the southwest. This was a combination butterfly trip and family enjoyment but, for a lot of the time, butterflies won. It was Steve's way of getting more time with Bronwyn and we completed useful butterfly observations also (24).

In April 2004, Steve and I returned from a trip to Dauan Island in Torres Strait only to discover that Steve had been diagnosed with terminal cancer and was initially given only a few weeks to live. This devastating news caused an immediate shift to Brisbane, to be closer to family. Sadly, expectations to the contrary, it was Bronwyn who passed away first, a very sad loss. Subsequently, despite declining health, Steve was keen to get out into butterfly locations in other parts of Australia that he had not visited. He went on many trips, including Kangaroo Island (October 2004), Alice Springs (February 2005, with Grant Miller), Lockerbie Scrub (April 2005) and Tasmania (January 2006). During these ventures Steve was often very sick from his cancer; it was tough on him but he was determined to experience some of the local species in the wild. We also took several trips to Western Australia up until 2013 (two trips in that year for the Julimar form of *Neolucia agricola occidentens* Waterhouse & Lyell, 1914 in March and *Ogyris subterrestris petrina* Field, 1999 in October). His brother Ian also spent a lot of time with Steve in his last few years, especially on trips to Torres Strait chasing new species and life histories.

The cherry picker innovation

No account of Steve's butterfly life can ignore the cherry picker innovation (Fig. 7). Over many years of our visits to Iron Range, on the long drive back to Townsville there would eventually be a reference to all the butterflies we could see up in the canopy of the rainforest but which we could not catch, despite our extension poles. Steve would eventually bemoan 'If only we had a cherry picker'. Following his diagnosis of cancer he concluded it was now or never and decided to have a cherry picker made to suit his purpose. Based on an Isuzu rigid truck, the tower reached to 20 metres with room for two people in the bucket. He drove it up from Brisbane to northern Queensland in June 2006 to try it out. We went to Cooktown and Shipton's Flat to test its suitability and gain some experience. In July that year, Steve drove it to Iron Range for its first field outing. It served well for many more years. We would drive it up at the end of the wet season and it would stay at Iron Range through the dry season, parked at the National Park headquarters between visits. Several trips to Iron Range were made each year, usually with one or more collectors joining Steve. These included Peter Wilson, Peter Samson, Kerrod Beattie, Grant Miller, Darryl Washbourne, David Lane, Bill Graham and others. I went with Steve on many occasions.

He also used the cherry picker in southern Queensland, on one occasion supporting an Entomological Society of Queensland field trip to Mt Glorious in April 2007. He gave rides to the canopy to a few people and helped a PhD student collect scale insects in the canopy (Figs 7a-b).

These trips with the cherry picker were much enjoyed by Steve and all who went with him. They did result in some excellent outcomes for his butterfly work. For example, after seeing the large high-flying nymphalid *Apaturina*

erminea (Cramer, 1779) on many occasions, the cherry picker enabled specimens to be collected as they rested at height on tree trunks (unpubl. obs.). Description of the complete life history of *Charaxes latona* Butler, 1865 (Fig. 5a) (47) was enabled after eggs were observed being laid on leaves in the canopy and subsequently collected. Work on other lycaenids that laid eggs high in the forest was also facilitated, including *Hypochrysops hippuris* Hewitson, 1874 (22), *Hypochrysops elgneri* (Waterhouse & Lyell, 1909) (30) and *Philiris ziska* (Grose-Smith, 1898) (29). In December 2008, a journalist and photographer joined Steve and I at Iron Range. They wanted a story on butterflies but in the end they loved the story of Steve. This story and photos appeared in the 2009 April/June edition of *Australian Geographic* (Van Tiggelin 2009). The journalist, John Van Tiggelin, had many positive things to say about Steve in the article. When I spoke with him at the time of Steve's funeral he described the Iron Range experience that year as his favourite assignment and Steve as his favourite character.



Fig. 7. Steve Johnson's cherry picker truck: (a) in use on an Entomological Society of Queensland field trip to Mt Glorious in April 2007; (b) Steve (on right) with student Ben Nomark searching for scale insects; (c) Steve (on right) with Peter Valentine high in the canopy at Iron Range in 2008. (Photos a and b by Noel Starick, c by Andrew Rankin).

Publications and influence

Steve was a prolific author and contributed a total of 47 peer-reviewed papers on Australian butterflies (see Bibliographic Appendix). His collaborative and supportive approach also meant that he published with many of Australia's most knowledgeable butterfly scholars. His co-authors number 15 and, while

the bulk of his publications were shared with me (30 papers), he also shared authorship more than once with four other authors and was a co-author with 10 other researchers. The publications include range extensions and habitat notes through many life history descriptions to several descriptions of new taxa (Table 1). Much of the focus was on Queensland but papers also covered Western Australia (both the south-west and the north) and the Northern Territory. The majority of Stephen Johnson's butterfly publications were in *Australian Entomologist*, which he also supported as a reviewer.

Significant work on the life histories of Australian butterflies covered many species but there were other contributions of lesser extent covering many other species. These were often published in papers covering biogeography or regional records of species.

Table 1. Butterfly species for which Steve Johnson made a significant published life history contribution. The relevant publications are shown in brackets after each species.

Family / Species	
HESPERIIDAE	RIODINIDAE
<i>Allora doleschallii</i> (C. Felder, 1860) (7)	<i>Praetaxila segecia</i> (Hewitson, 1861) (31)
<i>Rachelia extrusa</i> (C & R. Felder, 1867) (45)	LYCAENIDAE
<i>Trapezites atkinsi</i> Williams, Williams & Hay, 1998 (44)	<i>Liphyra brassolis</i> Westwood, 1864 (16)
<i>Trapezites taori</i> Atkins, 1997 (23)	<i>Hypochrysops elgneri</i> (Waterhouse & Lyell, 1909) (30)
<i>Neohesperilla senta</i> (Miskin, 1891) (25)	<i>Hypochrysops polycletus</i> (Linnaeus, 1758) (14)
<i>Hesperilla sarnia</i> Atkins, 1978 (15)	<i>Hypochrysops miskini</i> (Waterhouse, 1903) (35)
<i>Telicota brachydesma</i> Lower, 1908 (43)	<i>Hypochrysops hippuris</i> (Hewitson, 1874) (22)
PAPILIONIDAE	
<i>Graphium aristeus</i> (Stoll, [1780]) (36)	<i>Philiris diana</i> Waterhouse & Lyell, 1914 (40)
NYMPHALIDAE	<i>Philiris ziska</i> (Grose-Smith, 1898) (29)
<i>Taenaris artemis</i> (Vollenhoven, 1860) (10)	<i>Deudorix epirus</i> (C. Felder, 1860) (3)
<i>Melanitis constantia</i> (Cramer, 1777) (13)	<i>Nesolycaena medicea</i> Braby, 1996 (21)
<i>Orosotriana medus</i> (Fabricius, 1775) (13)	<i>Catopyrops ancyra</i> (C. Felder, 1860) (39)
<i>Charaxes latona</i> Butler, 1865 (47)	
<i>Libythea geoffroy</i> Godart, 1824 (18)	

Steve Johnson was also the first to record several taxa from Australia, including *Paraduba metriodes* (Bethune-Baker, 1911) (Lycaenidae) (11), *Charaxes latona* Butler, 1865 (Nymphalidae) (6), *Melanitis constantia* (Cramer, 1777) (Nymphalidae) (13), *Euploea netscheri* Snellen, 1889 (Nymphalidae) (20), *Philiris azula* Wind & Clench, 1947 (Lycaenidae) (9), *Hypochrysops cleon* Grose-Smith, 1900 (Lycaenidae) (32), *Prosotas gracilis* (Röber, 1886) (Lycaenidae) (20), *Nacaduba calauria* (C. Felder, 1861) (Lycaenidae) (20) and *Cethosia cydippe damasippe* C. & R. Felder, 1867 (Nymphalidae) (27). In addition, Steve rediscovered *Taenaris artemis queenslandica* Rothschild, 1916 (Nymphalidae) at the Lockerbie scrub, Cape York Peninsula (10) and also helped rediscover *Tagiades nestus* (C. Felder, 1860) on Dauan Island in Torres Strait (46). He contributed to our knowledge of many other species, including *Delias lara* (Boisduval, 1836) (Pieridae) (28).

Although Steve was not focused on taxonomic work but rather encouraged and supported others in their endeavours, he did take the initiative in describing several taxa. These were *Hesperilla malindeva dagoomba* Johnson & Valentine, 1994 (Hesperiidae) (19), *Hesperilla crypsargyra binna* Johnson & Wilson, 2005 (Hesperiidae) (26), *Jalmenus notocrucifer* Johnson, Hay & Bollam, 1992 (Lycaenidae) (8) and *Jalmenus inous bromwynae* Johnson & Valentine, 2007 (Lycaenidae) (24). The subspecific epithet *dagoomba* was chosen by Steve as an Aboriginal place name for Magnetic Island and his choice of *bromwynae* was to honour his wife.

Many of the species on which Steve Johnson made a significant contribution are shown in Figs 8 and 9.

The Johnson Collection at the Museum of Tropical Queensland

Steve Johnson put together, over many years, an outstanding collection of Australian butterflies. It is the product of over forty years of collecting, although most of the material was added after Steve moved to Townsville. Given the initial diagnosis of terminal cancer in 2004, with perhaps a few weeks to live, Steve arranged for the collection to go to the Museum of Tropical Queensland. The Johnson Collection, housed in drawers and cabinets built by Steve over the years, is one of the most comprehensive collections of Australian butterflies (Table 2, Fig. 10). Consisting of over 12,000 specimens, it covers all families and is missing only two genera and a handful of species (Table 2). Note that Steve did not include the five species only known from Christmas Island and the one species only known from Norfolk Island as part of the Australian Biogeographic Region. Of the missing species, Steve had seen two in the wild (*Prosotas gracilis* and *Tagiades nestus*) and had made several trips to Burrell's Trig in the Northern Territory in search of another, *Acrodipsas decima* Miller & Lane, 2004. The vast majority of the specimens in the collection were netted by Steve in the wild or reared by him from material he collected in the wild.



Fig. 8. Australian butterfly species strongly associated with Steve Johnson: (a) *Taenaris artemis*; (b) *Apaturina erminea*; (c) *Charaxes latona*; (d) *Melanitis constantia*; (e) *Liphya brassolis* (♀); (f) *Graphium aristeus* (♂); (g-h) *Libythea geoffroy* (♂ & ♀). All of these species are from tropical Queensland, mostly Cape York Peninsula.



Fig. 9. Australian butterfly species about which Steve Johnson contributed significant new knowledge: (a-b) *Hypochrysops elgneri* (♂ & ♀); (c-d) *H. hippuris* (♂ & ♀); (e-f) *H. polycletus* (♂ & ♀); (g-h) *H. cleon* (♂ & ♀); (i-j) *Philiris diana papuana* (♂ & ♀); (k-l) *Nesolycaena medicea* (♂ & ♀); (m-n) *Nacaduba calauria* (♂ & ♀); (o) *Prosotus gracilis* (♀); (p-q) *Catopyrops ancyra* (♂ & ♀); (r) *Tagiades nestus* (♂); (s-t) *Allora doleschallii* (♂ & ♀); (u) *Telicota brachydesma* (♂); (v-w) *Rachelia extrusa* (♂ & ♀); (x) *Trapezites taori* (♀); (y) *T. atkinsi* (♂). All but one of these are from the Queensland tropics, the last from southwestern Australia.

Table 2. Details of the Johnson Collection at the Museum of Tropical Queensland. These totals do not include specimens Steve collected during 2015, which added a few more individuals from Dauan Island and Weipa but no new species.

Family	Specimens	Species	Species (and number) Reared	Australian species missing
Hesperiidae	3750	122	86 (1366)	<i>Tagiades nestus</i>
Papilionidae	303	18	16 (176)	None
Pieridae	867	36	21 (348)	<i>Appias celestina</i>
Nymphalidae	1867	83	46 (580)	<i>Euploea modesta</i> , <i>Junonia erigone</i> , <i>Lexias aeropa</i> , <i>Taenaris catops</i>
Libytheidae	26	1	1 (3)	None
Lycaenidae	5499	151	113 (2643)	<i>Acrodipsas decima</i> , <i>Nothodanis schaffera</i> , <i>Prosotas gracilis</i>
Totals	12,312	411	283 (5116)	9 species missing

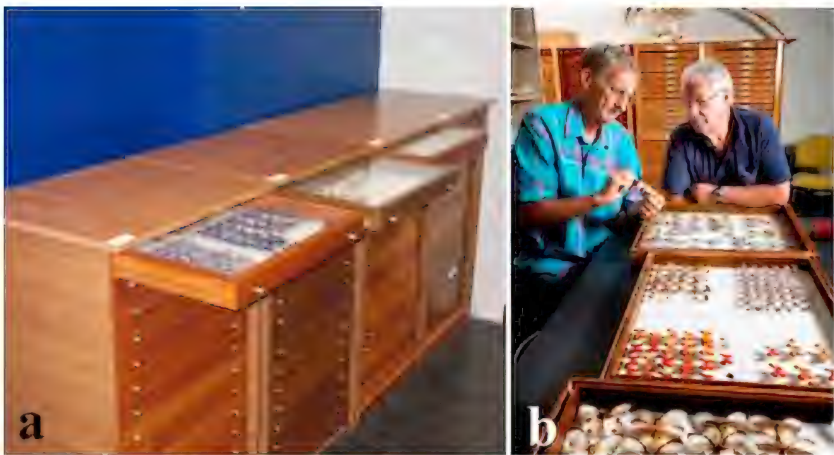


Fig. 10. (a) Part of the Johnson Collection cabinets and drawers built by Steve Johnson; now in the Museum of Tropical Queensland; (b) Steve Johnson and Peter Valentine working on the Johnson Collection, Museum of Tropical Queensland, Townsville, 2009. (Photos by (a) Niel Bruce, MTQ; (b) Andrew Rankin).

Conclusion

Stephen Johnson is very well remembered by many in the Australian butterfly world. He personally supported all he met and shared his excellent knowledge with anyone who had an interest. He was generous in every way and an enthusiast for all things butterfly. A nice example was the 'birthday gift' to Grant Miller of a pair of *Pithecopis dionisius* (Boisduval, 1832). Grant had been trying to find these for so long he had taken to calling them 'Mythecops'. Steve was similarly generous with specimens to others and many collections include excellent material with a label indicating S.J. Johnson as the collector. His premature death leaves a gap in our butterfly science, especially in northern Australia. My own life has hundreds of wonderful memories from our intertwined butterfly songlines.

Acknowledgements

In preparing this account I have benefited very much from the support of Steve's immediate family, especially his brother Ian and his son Matthew. Ian prepared a moving eulogy to Steve at his funeral and that provided me with much of the framework about Steve's early life. Ian was also able to fill in details about some of the more recent collecting trips to Dauan as well as his recollections of early trips to Iron Range. Many other butterfly people were pleased to share their recollections about Steve and I thank them all, in particular Geoff Monteith, Grant Miller, Peter Wilson, Don Sands, Kerrod Beattie, Trevor Lambkin, Darryl Washbourne, Ted Edwards, Steve Brown, Cliff Meyer, Max Moulds, David Lane, Mike Barnett, Bill Graham and John Young. Geoff Monteith has given much editorial assistance in preparing the text and illustrations.

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